

Internal Combustion Engine Modeling
Take Home Project-Exam Midterm-I
31.03.2024

Write a Matlab program that can simulate a real IC engine cycle during the period that all valves are closed by using single-zone modeling with heat transfer loss and Wiebe function sub-models. Plot

1. instantaneous volume vs crank angle, instantaneous piston velocity
 2. in-cylinder temperature $T-\theta$,
 3. in-cylinder pressure $P-\theta$,
 4. mass-fraction burned vs crank angle and
 5. normalized pressure-volume diagram [$\log P - (V/V_{cls})$] on a semi-log chart, for a given RPM.
 6. Calculate IMEP, thermal efficiency, indicated power & torque and also brake power & torque curve for the given engine speed using friction model (i.e. axis of abscissa will be engine speed in RPM)
- First choose a single cylinder engine to simulate as a default engine for the simulation.
 - Prepare a basic GUI (or AppDesigner) for which input values can be given for default and any other engine for the simulation. Output of the program can be power, torque, BSFC, efficiencies and so on. Graphs can be plotted on separate windows. Use engineering units.

A small report and the Matlab file will be submitted by 20.04.2024 @ 23:59.